

Interface Protocol



Ultrasonic Sensors with analog output
US-Q12M

Vendor ID

Vendor name	Hex	Dec
di-soric GmbH & Co. KG	0x0221	545

Product ID

Product	Product ID	Device ID	
		hex	dec
US Q12 M 200 IU-B4	210963	0x0000B0	176
US Q12 M 400 IU-B4	210968	0x0000B5	181

Identification

Parameter Description	Index		R/W	Length	Data Type	Value
	dec	hex				
Vendor name	16	0x0010	RO	64	StringT	di-soric GmbH & Co. KG
Vendor text	17	0x0011	RO	64	StringT	SOLUTIONS. CLEVER. PRACTICAL.:
Product name	18	0x0012	RO	64	StringT	
Product ID	19	0x0013	RO	64	StringT	
Product Text	20	0x0014	RO	64	StringT	
Lot	64	0x0040	RO	16	StringT	
Firmware Revision	23	0x0017	RO	64	StringT	
Application Specific Tag*	24	0x0018	RW	32	StringT	

*Part of Data Storage

Features

IO-Link Revision	V1.1
Data Storage ("DS")	Yes
Block Parameter	Yes
Min. Cycle Time	2,3 ms
SIO-Mode	Yes
Transmission Rate	38,4 kbit/s (COM2)
ISDU	Supported
Process Data Input (Device to Master)	2 byte
Process Data Output (Master to Device)	N/A

Profile

Smart Sensor SSP 0	Generic Profiled Sensor
Function	Device identification Multiple switching signal Process data variable Device diagnosis Teach channel

Process Data Input (Device to Master)

Octet	0								1							
Bit Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Subindex	1															2
	Measured value*															Switch state

Subindex	Name	Bit Offset	Length	Range
1	Measured value Distance in mm	4	UInt 12bit	0 ... 4095
2	Switch state	0	Boolean 1bit	0 = inactive 1 = active

Process Data Output (Master to Device)

N/A

Device Data

Device Access Locks

Parameter Description	Index		Subindex		Size (b)	R/W	Data Type	DS	Default	Range
	dec	hex	dec	hex						
Parameter Write Access	12	0x000C	1	0x01	1	RW	BooleanT	X	0	1 – locked 0 – unlocked
Data Storage	12	0x000C	2	0x02	1	RW	BooleanT	X		1 – locked 0 – unlocked
Local Parameterization	12	0x000C	3	0x03	1	RW	BooleanT	X	0	1 – locked 0 – unlocked

General Configuration

Parameter Description	Index		Subindex		Size (B)	R/W	Data Type	DS	Default	Range
	dec	hex	dec	hex						
Output Configuration										
Multi I/O (Pin 4)	70	0x0046	0	0x00	1	R/W	UInt8	X	3	0 = PP 1 = NPN 2 = PNP 3 = Teach-In Analog 4 = Synchronisation 5 = Multiplex
Multi I/O (Pin 2)	71	0x0047	0	0x00	1	R/W	UInt8	X	2	0 = disabled 1 = 0 to 20mA 2 = 4 to 20mA 3 = 0 to 10V
Analog Output Multi I/O (Pin 2)										
Lower Limit	72	0x0048	1	0x01	2	R/W	UInt16	X	*	*(variable for each type, see table below)
Upper Limit	72	0x0048	2	0x02	2	R/W	UInt16	X	*	*(variable for each type, see table below)
Switching Output Multi I/O (Pin 4)										
Mode	61	0x003D	2	0x02	1	R/W	UInt8	X	2	0 = Deactivated 1 = Single point mode 2 = Window mode 3 = Two point mode 128 = Reflex mode
Logic	61	0x003D	1	0x01	1	R/W	UInt8	X	0	0 = NO 1 = NC
Hysteresis	61	0x003D	3	0x03	2	R/W	UInt16	X	*	*(variable for each type, see table below)
Setpoint 1	60	0x003C	1	0x01	2	R/W	UInt16	X	*	*(variable for each type, see table below)
Setpoint 2	60	0x003C	2	0x02	2	R/W	UInt16	X	*	*(variable for each type, see table below)
Multiplex/Synchronisation Settings										
Role in Network	88	0x0058	1	0x01	1	R/W	UInt8	X	0	0 = Master, 1 = Slave
Device No. (Master highest No.)	88	0x0058	2	0x02	1	R/W	UInt8	X	1	1 ... 10
Additional Functions										
Temperature Compensation	74	0x004A	0	0x00	1	R/W	UInt8	X	0	0 = Off, 1 = On
On delay switching output	66	0x0042	0	0x00	2	R/W	UInt16	X	0	0 ... 10000 ms
Off delay switching output	67	0x0043	0	0x00	2	R/W	UInt16	X	0	0 ... 10000 ms
Teach State										
Teach State	59	0x003B	3	0x03	0,5	RO	UInt4		0	0 = Idle 1 = Switchpoint Set 2 = Switchpoint 2 Set 3 = Switchpoint 1+2 Set 4 = Wait for Command 5 = Busy 6 = Reserved 7 = Error
Teachpoint SP1 (lower limit)**	80	0x0050	1	0x01	2	RO	UInt16			0 ... 65535
Teachpoint SP1 (upper limit) **	80	0x0050	2	0x02	2	RO	UInt16			0 ... 65535
Teachpoint SP2 (lower limit)**	81	0x0051	1	0x01	2	RO	UInt16			0 ... 65535
Teachpoint SP2 (upper limit) **	81	0x0051	2	0x02	2	RO	UInt16			0 ... 65535

**detected limit during teach-in procedure

Variable data for each device:

Product ID	Default Value					Range	
	Hysteresis	Lower Limit	Upper Limit	Setpoint: 1	Setpoint: 2	Hysteresis	Limits Setpoints
US Q12 M 200 IU-B4	2	20	200	20	200	2 ... 20	20 ... 200
US Q12 M 400 IU-B4	2	40	400	40	400	2 ... 20	40 ... 400

Standard Command

Command interface for applications. A positive response indicates the complete and correct execution of the requested function.

Index		Subindex		Data Type	R/W
dec	hex	dec	hex		
2	0x0002	0	0x00	UInt8	WO

Number		Parameter Description	Modifies others
dec	hex		
64	0x40	Teach Apply	X
65	0x41	Setpoint 1 Single Value Teach	X
66	0x42	Setpoint 2 Single Value Teach	X
67	0x43	Two Value Teach TP1 SP1	X
68	0x44	Two Value Teach TP2 SP1	X
69	0x45	Two Value Teach TP1 SP2	X
70	0x46	Two Value Teach TP2 SP2	X
71	0x47	Setpoint 1 Dynamic Teach Start	X
72	0x48	Setpoint 1 Dynamic Teach Stop	X
73	0x49	Setpoint 2 Dynamic Teach Start	X
74	0x4A	Setpoint 2 Dynamic Teach Stop	X
79	0x4F	Teach Cancel	X
130	0x82	Restore Factory Settings	X
161	0xA1	Set Analog Output Lower Limit	X
162	0xA2	Set Analog Output Upper Limit	X
163	0xA3	Reset Diagnosis Information	X
164	0xA4	Stop measurement	X
165	0xA5	Start measurement	X
166	0xA6	Single measurement	X

Diagnosis

Parameter Description	Index		Subindex		Size (B)	R/W	Data Type	Dynamic	Default	Range
	dec	hex	dec	hex						
Device Status	36	0x0024	0	0x00	1	RO	UInt8	X		0 = Device is OK 1 = Maintenance required 2 = Out of specification 3 = Functional check 4 = Failure
Switch counter	85	0x0055	0	0x00	4	RO	UInt32	X	0	
Internal Temperature	86	0x0056	0	0x00	2	RO	Int16	X		-32768 ... 32767
Lower limit after power-up or reset	84	0x0054	1	0x01	2	RO	UInt16	X		0 ... 65535
Upper limit after power-up or reset	84	0x0054	2	0x02	2	RO	UInt16	X		0 ... 65535

Events

Event Code		Event Type	Event Name	Event Description
dec	hex			
36000	0x8E10	Warning	Set point warning	Set points may be inappropriate
36350	0x8DFE	Warning	Test Event 1	Event appears by setting index 2 to value 240, Event disappears by setting index 2 to value 241
36351	0x8DFF	Warning	Test Event 2	Event appears by setting index 2 to value 242, Event disappears by setting index 2 to value 243

Errors

Error Code		Additional code		Error Name	Description
dec	hex	dec	hex		
128	0x80	0	0x00	Device application error - no details	Service has been refused by the device application and no detailed information of the incident is available
128	0x80	17	0x11	Index not available	Access occurs to a not existing index
128	0x80	18	0x12	Subindex not available	Access occurs to a not existing subindex
128	0x80	32	0x20	Service temporarily not available	Parameter is not accessible due to the current state of the device application
128	0x80	35	0x23	Access denied	Write access on a read-only parameter
128	0x80	48	0x30	Parameter value out of range	Written parameter value is outside its permitted value range
128	0x80	49	0x31	Parameter value above limit	Written parameter value is above its specified value range
128	0x80	50	0x32	Parameter value below limit	Written parameter value is below its specified value range
128	0x80	51	0x33	Parameter length overrun	Written parameter length is above its predefined length
128	0x80	52	0x34	Parameter length underrun	Written parameter length is below its predefined length
128	0x80	53	0x35	Function not available	Written command is not supported by the device application
128	0x80	54	0x36	Function temporarily unavailable	Written command is not available due to the current state of the device application
128	0x80	64	0x40	Invalid parameter set	Written single parameter collides with other actual parameter settings
128	0x80	65	0x41	Inconsistent parameter set	Parameter inconsistencies were found at the end of block parameter transfer, device plausibility check failed
128	0x80	130	0x82	Application not ready	Read or write service is refused due to a temporarily unavailable application